

REMARKS/ARGUMENTS

Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Upon entry of the above amendments, claims 15-32, as amended, will be pending. Claim 31 has been rewritten in independent form. Accordingly, in view of the indication of allowability in paragraph 12 of the Official Action, Claim 31 is now in condition for allowance.

Minor amendments are introduced for clarity in Claims 20 and 22. No new matter has been added. No new issues require further consideration or search.

The applicant acknowledges that Schofield et al. discloses a method for drop-on-demand printing an image in a substrate comprising applying a non-aqueous ink to the substrate wherein the ink has a viscosity of 6-30 mPa.s comprising pigment, non-aqueous medium which itself comprises aliphatic hydrocarbon solvent and oleyl alcohol and possesses a solubility parameter of 0.1-5 MPa^{1/2} and dispersant. The dispersant is formed by reacting polyalkylenimine with a polyester, the details of which are incorporated by reference to GB2001083.

However, it should be noted that the polyester described in GB2001083 is derived from a hydroxyl carboxylic acid HO-X-COOH wherein X is a saturated (e.g. hydroxy stearic acid) or unsaturated (e.g. ricinoleic acid) aliphatic group or mixture thereof, (page 1, lines 12 to 15). Furthermore, the dispersant (i.e. the salt or amide of the reaction product) may be partially neutralised with an acid or it may be quaternised with for example dimethyl sulphate (page 1, lines 16 to 18).

The dispersants of Schofield et al thus include polyesters made from saturated and/or unsaturated hydroxy carboxylic acids. The dispersant may be in the form of a free base, a salt of an acid especially a mineral acid or it maybe in the form of a quaternary ammonia salt.

The dispersants of claim 15 are derived only from a saturated hydroxy carboxylic acid. Note that A is defined as a C₈₋₂₀-alkylene. There is no structural provision for salts with a mineral acid or quaternary ammonium analogues. The structure of formula 1 in claim 15 does not include mineral salts or quats. Rather, the dispersant is in the form of its free-base as described on page 3, lines 19 to 20. The Applicant, therefore, submits that the dispersants used in claim 15 constitute a narrow selection out of Schofield et al.

The Applicant also acknowledges that the weight ratio of the polyester to polyethylene imine is preferably from 1 to 10 in GB2001083. However, it is clearly preferred that the weight ratio of polyester to polyalkylene imine is from 2 to 5. The weight ratio of polyester to polyimine in claim 15 is from 7:1 to 20:1 which is outside the preferred range of Schofield et al in view of GB2001083.

The working examples of GB2001083 utilise polyethylene imine (PEI) and polyester A which is derived from 12-hydroxystearic acid where the weight ratio of polyester to PEI is either 1:1 or 2:1 which are in the form of the free base (Agents A, B, C, H J and K), as acid salts (Agents F and G) or quaternary ammonium salts (Agents D and E). Agent I is made from ricinoleic acid (unsaturated) and Agent E is a quaternary ammonium salt with dimethyl sulphate where the ratio of the polyester to PEI is 8:1 by weight. Thus GB2001083 exemplifies many dispersant structures according to its invention but none of these fall within the scope of the Applicant's claims.

In the application examples of GB2001083 there is no distinction made between dispersants in the form of free base, dispersants in the form of a salt with a mineral acid or dispersant in the form of quaternary ammonium salts. Thus taking Schofield et al in view of GB2001083 the dispersants are all equivalent and interchangeable.

However, the Applicant has found that a significant advantage exists in Receding Meniscus Viscosity (RMV) where the weight ratio of polyester to PEI is from 7:1 to 20:1 as stated in claim 15. A comparison has been made in Tables 2 to 6 with Dispersant A where the weight ratio of polyester to PEI is 3.5:1. Dispersant A falls within the preferred range of GB2001083. This advantage is neither foreshadowed nor envisaged by Schofield et al in view of GB2001083 and supports the Applicants submission that the dispersants used in claim 15 would not have been obvious.

The comparative data discussed in the last Official Action which are from the specification (page 7, Table 1) demonstrate a surprising effect in superior Receding Meniscus Velocity (RMV). Table 1 shows three examples within the claimed ratio of polyester to polyimine or polyamine from 7:1 to 20:1 and compares this to an example within the preferred disclosure of GB 2001083 of 3.5:1. On pages 8 and 9 of the Official Action the Examiner requests clarification of the amounts of dispersant and solvent. The Examiner's attention is drawn to the Applicants specification page 7, line 25 to page 8, line 3 and

particularly to the concentration of the dispersant in the formulations of page 7, Table 1. Thus in Examples 1, 2 and 3 the amount of dispersant used is $1.37 \text{ parts} \times 50\% \text{ concentration} = 0.685 \text{ parts}$. Similarly for comparative example A the amount of dispersant is $1.71 \text{ parts} \times 40\% = 0.684 \text{ parts}$. In a similar fashion in examples 1 to 3 the amount of hydrocarbon solvent is $3.54 + 1.37 \times 50\% = 4.225 \text{ parts}$ and for the comparative example there is $3.20 + 60\% \times 1.71 = 4.226 \text{ parts}$. Thus the amounts of both dispersant and solvent are already comparable and hence Table 1 properly indicates nothing other than a surprising technical effect in RMV which is neither disclosed nor envisaged in GB2001083.

Claim 25 stands rejected under 103(a) as being allegedly unpatentable over Schofield et al (US 5,837,046) in view of GB2001083.

As noted supra, the invention claimed in claim 15 constitutes a novel and inventive selection out of Schofield et al in view of GB 2001083 especially with regard to the dispersant structure. Claim 25 depends on claim 15 but requires that the ink additionally comprises a fluidizing agent. The disclosure in GB2001083 regarding fluidizer adds nothing regarding the dispersant and hence does not anticipate nor make obvious the method of claim 25.

Claims 26 and 27 stand rejected under 103(a) as being allegedly unpatentable over Schofield et al (US 5,837,046) in view of WO 97/15633.

The Applicant acknowledges that WO 97/15633 discloses improved ink jet printing inks containing a neutraliser (RMV) which reacts with acidic or basic groups in the dispersant (page 4, first paragraph). However, W097/15633 discloses nothing regarding the nature of the Applicant's dispersant as in claim 15. Thus because claim 15 is both novel and inventive then so are dependent claims 26 and 27.

Claims 15 to 30 and 32 stand rejected under 103(a) as being allegedly unpatentable over WO97/15633 in view of GB2001083. The Examiner has acknowledged as differences between WO 07/15633 and the present invention as claimed in claim 16, the requirements for (a) a specific type of dispersant and (b) a fluidising agent.

As discussed supra, GB 2001083 discloses polyester/polyalkylene imine dispersants which are in the form of the free base, acid salt with a mineral acid and quaternary ammonium salt. The polyester may be derived from saturated or unsaturated hydroxycarboxylic acids. No distinction is made between these dispersants and all behave

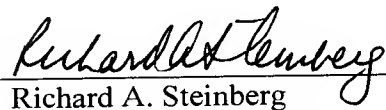
similarly in ink jet printing. Equally there is no teaching to the claimed ratio of polyester to polyamine or polyimine. There is, therefore, no motivation to select the dispersant used in claim 15 which is in the form of a free base, which are derived from saturated aliphatic acids and which are within specified ratios of polyester to polyamine or polyimine. WO 97/15633 relates to RMV modifiers but makes no disclosure relevant to the Applicant's dispersant. Consequently even if WO 97/15633 is combined with GB 2001083 the skilled person would still not be led to the claimed invention.

Therefore, all objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Should any issues remain unresolved, the Examiner is encouraged to contact the undersigned attorney for Applicants at the telephone number indicated below in order to expeditiously resolve any remaining issues.

Respectfully submitted,

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